CLAIMS

What is claimed is:

1. A network comprising:

a first network node having a first transponder for receiving and transmitting communications signals, said first network node further comprising a first receiver for receiving position signals from a plurality of navigation beacons; and,

a second network node having a second transponder for receiving and transmitting said communications signals, said second network node further comprising a second receiver for receiving position signals from a plurality of navigation beacons,

wherein each of said first and second receivers further include local code generators that are also used as transmitter code generators for said first and second transponders.

2. The network of claim 1, wherein a signal modulation process of said first and second network nodes is reciprocal to a signal demodulation process for said first and second network nodes.

3. The network of claim 2, wherein said signal modulation process and signal demodulation process are based on modulo-2 addition.

4. The network of claim 1, wherein said communication signals are generated by direct conversation using binary phase shift keying.

5. The network of claim 1, wherein said first and second receivers are direct sequence spread spectrum positioning receivers.

6. The network of claim 5, wherein said first and second receivers use correlators and pseudo random number (PRN) code tracking loops for synchronization, and wherein signals from said correlators and PRN code tracking loops are inputted to a complimentary code keying (CCK) modulator to generate said communication signals.

7. The network of claim 6, wherein the signals from said correlators and PRN code tracking loops are combined and summed to provide a CCK signal.

8. The network of claim 7, wherein said CCK signal is up-converted to change a frequency of the CCK signal to match a frequency of said communication signals.

9. The network of claim 1 wherein said first and second network nodes are addressable using one or more spatial parameters which include at least one of a position parameter and a velocity parameter.

10. The network of claim 1, wherein said first and second network node contain a topology of the network, said topology to be updated in response to network topology changes.

11. The network of claim 1, further comprising a master transmitter that sets the basic frequency and phase of said network and said first and second network nodes.

12. The network of claim 1, further comprising a plurality of navigation beacons which transmit position signals to said first and second network nodes.

13. The network of claim 12, wherein said communication signals are synchronized to said position signals.

14. The network of claim 12, wherein said communication signals are used as ranging signals for other network nodes, said other network nodes to determine signal propagation time using signal time tagging.

15. The network of claim 12, wherein said communication signals substitute for said position signals in determining network node position information.

16. The network of claim 15, wherein said communication signals are used to provide frequency and signal phase assistance in the determination of node position information.

17. The network of claim 16, wherein said frequency and signal phase assistance is used by said first network node to detect attenuated positioning signals from said plurality of navigation beacons.

18. A positioning device coupled to a network, comprising:

a receiver to receive position signals from a plurality of navigation beacons, said receiver to include a receiver code generator;

a transponder to receive and transmit communication signals, said transponder to use said receiver code generator as a transmitter code generator;

a processor coupled to the receiver and transponder; and

a memory coupled to the processor to store one or more instruction sequences, said instruction sequences to cause the positioning device to transmit said communication signals between said positioning device and a second positioning device.

19. The positioning device of claim 18, wherein a signal modulation process of said positioning device is reciprocal to a signal demodulation process for said positioning device.

20. The positioning device of claim 19, wherein said signal modulation process and signal demodulation process are based on modulo-2 addition.

21. The positioning device of claim 18, wherein said communication signals are generated by direct conversion using binary phase shift keying.

22. The positioning device of claim 18, wherein said receiver is a direct sequence spread spectrum positioning receiver.

23. The positioning device of claim 22, wherein said receiver uses correlators and pseudo random number (PRN) code tracking loops for synchronization, and wherein signals from said correlators and PRN code tracking loops are inputted to a complimentary code keying (CCK) modulator to generate said communication signals.

24. The positioning device of claim 23, wherein said signals from said correlators and PRN code tracking loops are combined and summed to provide a CCK signal.

25. The positioning device of claim 24, wherein said CCK signal is up-converted to change a frequency of the CCK signal to match a frequency of said communication signals.

26. The positioning device of claim 18 wherein said positioning device is addressable using one or more spatial parameters which include at least one of a position parameter and a velocity parameter.

27. The positioning device of claim 18, wherein said memory further includes a topology of the network, said topology to be updated in response to network topology changes.

28. The positioning device of claim 18, further comprising a master transmitter that sets the basic frequency and phase of said network and said positioning device.

29. The positioning device of claim 18, further comprising a plurality of navigation beacons which transmit position signals to said positioning device.

30. The positioning device of claim 29, wherein said communication signals are synchronized to said position signals.

31. The positioning device of claim 29, wherein said communication signals are used as ranging signals for other positioning devices coupled to the network, said other positioning devices to determine signal propagation time using signal time tagging.

32. The positioning device of claim 29, wherein said communication signals substitute for said position signals in determining position information.

33. The positioning device of claim 32, wherein said communication signals are used to provide frequency and signal phase assistance in the determination of position information.

34. The positioning device of claim 33, wherein said frequency and signal phase assistance is used by said positioning device to detect attenuated positioning signals from said plurality of navigation beacons.

35. A method comprising:

transmitting communication signals from a first network node to a second network node, said first and second network nodes to comprise a network and to each include a receiver portion and a transponder portion;

receiving, by said first and second network nodes, position signals from a plurality of navigation beacons;

generating transmitter codes for said transponder portions using local code generators of said receiver portions.

36. The method of claim 35, further comprising:

performing, by said first and second network nodes, a signal modulation process; and

performing, by said first and second network nodes, a signal demodulation process, wherein said signal modulation process is reciprocal to said signal demodulation process.

37. The method of claim 36, wherein said signal modulation process and signal demodulation process are based on modulo-2 addition.

38. The method of claim 35, further comprising generating said communication signals by direct conversation using binary phase shift keying.

39. The method of claim 35, wherein said receiver portions for said first and second network nodes are direct sequence spread spectrum positioning receivers.

40. The method of claim 39, further comprising:

using, by said receiver portions, correlators and pseudo random number (PRN) code tracking loops for synchronization; and,

inputted, to a complimentary code keying (CCK) modulator, signals from said correlators and PRN code tracking loops to generate said communication signals.

41. The method of claim 40, further comprising combining and summing the signals from said correlators and PRN code tracking loops to provide a CCK signal.

42. The method of claim 41, further comprising up-converting said CCK signal to change a frequency of the CCK signal to match a frequency of said communication signals.

43. The method of claim 35, further comprising addressing said first and second network nodes using one or more spatial parameters which include at least one of a position parameter and a velocity parameter.

44. The method of claim 35, wherein said first and second network node contain a topology of the network, said topology to be updated in response to network topology changes.

45. The method of claim 35, further comprising setting a basic frequency and phase of said network and said first and second network nodes using a master transmitter.

46. The method of claim 35, further comprising transmitting position signals from a plurality of navigation beacons to said first and second network nodes.

47. The method of claim 46, further comprising synchronizing said communication signals to said position signals.

48. The method of claim 46, further comprising using said communication signals as ranging signals for other network nodes, said other network nodes to determine signal propagation time using signal time tagging.

49. The method of claim 46, further comprising substituting said communication signals for said position signals in determining network node position information.

50. The method of claim 49, further comprising using said communication signals to provide frequency and signal phase assistance in the determination of node position information.

51. The method of claim 49, further comprising using, by said first network node, the frequency and signal phase assistance to detect attenuated positioning signals from said plurality of navigation beacons.